

CLASSIFICATION:

**UNCLASSIFIED**

EXHIBIT R-2, RDT&E Budget Item Justification						DATE: February 2000			
APPROPRIATION/BUDGET ACTIVITY				R-1 ITEM NOMENCLATURE					
RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY - BA 4				Cooperative Engagement Capability 0603658N					
COST (\$ in Millions)	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Total PE Cost	189.648	189.877	119.257	49.135	48.842	46.868	47.001	Cont.	Cont.
Cooperative Engagement Capability (CEC) K2039	115.111	114.296	119.257	49.135	48.842	46.868	47.001	Cont.	Cont.
Cooperative Engagement Capability (CEC) K2616	74.537	75.581	0.000	0.000	0.000	0.000	0.000	0.000	150.118
Quantity of RDT&E Articles									22
A. (U) Mission Description and Budget Item Justification: Cooperative Engagement Capability (CEC) significantly improves Battle Force Anti-Air Warfare (AAW) capability by coordinating all Battle Force AAW sensors into a single, real-time, composite track picture capable of fire control quality. CEC distributes sensor data from each ship and aircraft, or cooperating unit (CU), to all other CUs in the battle force through a real-time, line of sight, high data rate sensor and engagement data distribution network. CEC is highly resistant to jamming and provides accurate gridlocking between CUs. Each CU independently employs high capacity, parallel processing and advanced algorithms to combine all distributed sensor data into a fire control quality track picture which is the same for all CUs. CEC data is presented as a superset of the best AAW sensor capabilities from each CU, all of which are integrated into a single input to each CU's combat weapons system. CEC will significantly improve our Battle Force defense in depth, including both local area and ship defense capabilities against current and future AAW threats. Moreover, CEC will provide critical connectivity and integration of over-land air defense systems capable of countering emerging air threats, including land attack cruise missiles, in a complex littoral environment.									
(U) CEC consists of the Data Distribution System (DDS), the Cooperative Engagement Processor (CEP), and Combat System modifications. The DDS encodes and distributes ownship sensor and engagement data, is a high capacity, jam resistant, directive system providing a precision gridlocking and high throughput of data. The CEP is a high capacity distributed processor which is able to process force levels of data in a timely manner that allows its output to be considered real-time fire control data. This data is passed to the ship's combat system as high quality data for which the ship can cue its onboard sensors or use the data to engage targets without actually tracking them.									

R-1 SHOPPING LIST - Item No. 60

**Exhibit R-2, RDT&E Budget Item Justification**  
 (Exhibit R-2, page 1 of 7)

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EXHIBIT R-2, RDT&E Budget Item Justification		DATE: <b>February 2000</b>
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, N/BA 4</b>	R-1 ITEM NOMENCLATURE <b>Cooperative Engagement Capability 0603658N</b>	
<p>(U) PROGRAM ACCOMPLISHMENTS AND PLANS:</p> <p>(U) FY 1999 ACCOMPLISHMENTS:</p> <ul style="list-style-type: none"> <li>- (U) (\$ 54.800) Continued CEC hardware and software engineering efforts at Raytheon Systems Company, St. Petersburg, FL; completed AN/USG-2 Design Agent transition from John Hopkins University, Applied Physics Laboratory, Laurel, MD.</li> <li>- (U) (\$ 24.200) Continued CEC TDA/DA engineering efforts at JHU/APL.</li> <li>- (U) (\$ 35.500) Continued CEC E-2C integration efforts at PMA-231.</li> <li>- (U) (\$ 1.698) Completed P-3 aircraft integration (Lockheed-Martin).</li> <li>- (U) (\$ 1.250) Initiated development of software baseline 2.2 (AEGIS Navy Area and Theater Wide TBMD integration) with Lockheed-Martin.</li> <li>- (U) (\$ 9.726) Continued integration of CEC with Space Based IR Sensors (SBIRS) at Lockheed-Martin.</li> <li>- (U) (\$ 7.667) Continued ACDS/CEC integration efforts (test support, correction of interoperability/interface problems).</li> <li>- (U) (\$ 12.536) Continued field support (In-service Engineering; software support; Integrated Logistics Support Planning).</li> <li>- (U) (\$ 20.443) Continued T&amp;E efforts; conducted engineering, developmental and operational testing.</li> <li>- (U) (\$ 12.079) Continued Navy integration exercises and integration efforts.</li> <li>- (U) (\$ 9.749) Continued Program Management support.</li> </ul> <p>(U) FY 2000 PLAN:</p> <ul style="list-style-type: none"> <li>- (U) (\$ 89.200) Continue CEC hardware and software engineering efforts and DA efforts at Raytheon Systems Company, St. Petersburg, FL.</li> <li>- (U) (\$ 10.800) Continue CEC TDA engineering efforts at JHU/APL.</li> <li>- (U) (\$ 11.600) Continue CEC E-2C integration efforts at PMA-231.</li> <li>- (U) (\$ 4.000) Continue development of software baseline 2.2 (AEGIS Navy Area and Theater Wide TBMD integration) with Lockheed-Martin.</li> <li>- (U) (\$ 13.300) Continue field support (In-service Engineering; software support; Integrated Logistics Support Planning).</li> <li>- (U) (\$ 30.000) Continue T&amp;E efforts; conduct engineering, developmental and operational testing.</li> <li>- (U) (\$ 15.500) Continue Navy integration exercises and integration efforts.</li> <li>- (U) (\$ 5.577) Continue Program Management support.</li> <li>- (U) (\$ 9.900) Support at-sea prototypes, risk reduction, systems engineering, and software development which will help the production Area Air Defense Commander system meet Joint Interoperability requirements.</li> </ul> <p>Note: \$4.315M of the FY00 plan is that portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.</p>		

R-1 SHOPPING LIST - Item No. 60

**Exhibit R-2, RDT&E Budget Item Justification**  
(Exhibit R-2, page 2 of 7)

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APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, N/BA 4</b>	R-1 ITEM NOMENCLATURE <b>Cooperative Engagement Capability 0603658N</b>																									
<p>(U) PROGRAM ACCOMPLISHMENTS AND PLANS: (Cont.)</p> <p>(U) FY 2001 PLAN:</p> <ul style="list-style-type: none"> <li>- (U) (\$ 35.300) Continue CEC hardware and software engineering efforts at Raytheon Systems Company, St. Petersburg, FL.</li> <li>- (U) (\$ 13.500) Continue CEC TDA engineering efforts at JHU/APL.</li> <li>- (U) (\$ 6.400) Continue CEC E-2C integration efforts at PMA-231.</li> <li>- (U) (\$ 2.000) Continue development of software baseline 2.2 (AEGIS Navy Area and Theater Wide TBMD integration) with Lockheed-Martin.</li> <li>- (U) (\$ 12.400) Continue field support (In-service Engineering; software support; Integrated Logistics Support Planning).</li> <li>- (U) (\$ 38.300) Continue T&amp;E efforts; conduct engineering, developmental and operational testing.</li> <li>- (U) (\$ 6.300) Continue Navy and integration exercises and integration efforts.</li> <li>- (U) (\$ 5.057) Continue Program Management support.</li> </ul> <p>B. (U) Program Change Summary:</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th style="text-align: right;">FY 1999</th> <th style="text-align: right;">FY 2000</th> <th style="text-align: right;">FY 2001</th> </tr> </thead> <tbody> <tr> <td>FY 2000 President's Budget:</td> <td style="text-align: right;">195.462</td> <td style="text-align: right;">114.931</td> <td style="text-align: right;">98.203</td> </tr> <tr> <td>Appropriated Value:</td> <td style="text-align: right;">196.123</td> <td style="text-align: right;">190.931</td> <td></td> </tr> <tr> <td>Adjustment to FY 1999/2000 Appropriated Value/</td> <td></td> <td></td> <td></td> </tr> <tr> <td>FY 2000 President's Budget:</td> <td style="text-align: right;">-6.475</td> <td style="text-align: right;">-1.054</td> <td style="text-align: right;">21.054</td> </tr> <tr> <td>FY 2001 PRES Budget Submit:</td> <td style="text-align: right;">189.648</td> <td style="text-align: right;">189.877</td> <td style="text-align: right;">119.257</td> </tr> </tbody> </table> <p><u>Funding:</u> The FY 1999 adjustments are due to a decrease for Congressional Undistributed reductions (\$-1.549); offset for Small Business Innovation Research (SBIR) (\$-4.609); and minor pricing adjustments (\$-0.317). The FY 2000 adjustment is due to an across-the-board budget reduction of (\$-1.054). The FY 2001 adjustments are due to the addition of (\$+22.250) to reduce technical risk associated with the change in the OPEVAL schedule; decrease for minor pricing adjustments (\$-0.189); an increase for adjustment of NWCF rates (\$0.106); an increase of (\$0.014) for military/civilian pay increases; a decrease of (\$-0.814) for nonpay purchases inflation reduction; and a decrease of (\$-0.313) for active Navy operations.</p>				FY 1999	FY 2000	FY 2001	FY 2000 President's Budget:	195.462	114.931	98.203	Appropriated Value:	196.123	190.931		Adjustment to FY 1999/2000 Appropriated Value/				FY 2000 President's Budget:	-6.475	-1.054	21.054	FY 2001 PRES Budget Submit:	189.648	189.877	119.257
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R-1 SHOPPING LIST - Item No. 60

**Exhibit R-2, RDT&E Budget Item Justification**

(Exhibit R-2, page 3 of 7)

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<p>B. (U) Program Change Summary: (Cont.)</p> <p><u>Schedule:</u> Detailed TECHEVAL/OPEVAL schedule has been refined with Fleet schedulers and is planned for Feb-May 2001, with Milestone III rescheduled from July 2001 to November 2001. Because of the Milestone III revision, a fourth LRIP is now planned for FY 2001. A detailed schedule is provided on page 5.</p> <p><u>Technical:</u> Not applicable.</p>																																																									
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 35%; vertical-align: top;">C. (U) Other Program Funding Summary:</td> <td style="width: 10%; text-align: center;"><u>FY 1999</u></td> <td style="width: 10%; text-align: center;"><u>FY 2000</u></td> <td style="width: 10%; text-align: center;"><u>FY 2001</u></td> <td style="width: 10%; text-align: center;"><u>FY 2002</u></td> <td style="width: 10%; text-align: center;"><u>FY 2003</u></td> <td style="width: 10%; text-align: center;"><u>FY 2004</u></td> <td style="width: 10%; text-align: center;"><u>FY 2005</u></td> <td style="width: 10%; text-align: center;">To <u>Complete</u></td> <td style="width: 10%; text-align: center;">Total <u>Cost</u></td> </tr> <tr> <td>OP,N (CEC) P-1 Item No. 70</td> <td style="text-align: right;">81.730</td> <td style="text-align: right;">60.157</td> <td style="text-align: right;">15.853</td> <td style="text-align: right;">117.329</td> <td style="text-align: right;">147.279</td> <td style="text-align: right;">115.197</td> <td style="text-align: right;">137.874</td> <td style="text-align: right;">616.793</td> <td style="text-align: right;">1,363.120</td> </tr> <tr> <td>SC,N (Various)</td> <td style="text-align: right;">15.700</td> <td style="text-align: right;">36.000</td> <td style="text-align: right;">20.500</td> <td style="text-align: right;">20.100</td> <td style="text-align: right;">48.900</td> <td style="text-align: right;">55.600</td> <td style="text-align: right;">52.600</td> <td style="text-align: right;">0.000</td> <td style="text-align: right;">271.000</td> </tr> <tr> <td>AP,N (E-2C) (BA-1/5)</td> <td></td> <td style="text-align: right;">12.700</td> <td style="text-align: right;">24.200</td> <td style="text-align: right;">19.700</td> <td style="text-align: right;">8.000</td> <td style="text-align: right;">31.200</td> <td style="text-align: right;">23.200</td> <td style="text-align: right;">386.100</td> <td style="text-align: right;">505.100</td> </tr> <tr> <td>O&amp;M,N (CEC)</td> <td style="text-align: right;">21.007</td> <td style="text-align: right;">21.330</td> <td style="text-align: right;">16.636</td> <td style="text-align: right;">18.092</td> <td style="text-align: right;">17.519</td> <td style="text-align: right;">20.471</td> <td style="text-align: right;">23.030</td> <td style="text-align: right;">Continuing</td> <td style="text-align: right;">Continuing</td> </tr> </table>								C. (U) Other Program Funding Summary:	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	To <u>Complete</u>	Total <u>Cost</u>	OP,N (CEC) P-1 Item No. 70	81.730	60.157	15.853	117.329	147.279	115.197	137.874	616.793	1,363.120	SC,N (Various)	15.700	36.000	20.500	20.100	48.900	55.600	52.600	0.000	271.000	AP,N (E-2C) (BA-1/5)		12.700	24.200	19.700	8.000	31.200	23.200	386.100	505.100	O&M,N (CEC)	21.007	21.330	16.636	18.092	17.519	20.471	23.030	Continuing	Continuing
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<p>D. (U) ACQUISITION STRATEGY:</p> <p>The CEC program was approved for Low Rate Initial Production (LRIP-1) in March 1998 and a sole source contract was awarded to Raytheon Systems Company, St. Petersburg, FL. A follow-on procurement of eleven (11) additional systems (LRIP-2) was approved 14 May 1999. Full Rate Production (FRP) is planned for December 2001 following completion of OPEVAL.</p> <p>The Navy, Raytheon Systems Company, and Lockheed-Martin Corporation have reached an agreement whereby:</p> <ul style="list-style-type: none"> <li>(a) Raytheon will be the design agent for Ship Self Defense System (SSDS) Mark 2, and design agent and implementor of CEC baseline 2.1 supporting SSDS Mark 2.</li> <li>(b) Lockheed-Martin will be the design agent for CEC baseline 2.2 effort which supports CEC integration into the TBMD program.</li> <li>(c) The Navy will plan for full and open competition for procurement of CEC equipment and engineering support.</li> </ul> <p>Concurrent contracts were awarded by the Navy on 30 April 1999 in accordance with the agreement, and award fees are structured to ensure cooperation between the contractors. Both contractors participate as members of a "Navy Review Team" of each other's design, and participate in a Navy-led task to define future architecture of CEC in a Battle Force context.</p>																																																									
<p>E. (U) SCHEDULE PROFILE: See Next Page.</p>																																																									

































R-1 SHOPPING LIST - Item No. 60

**Exhibit R-2, RDT&E Budget Item Justification**  
(Exhibit R-2, page 4 of 7)

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APPROPRIATION/BUDGET ACTIVITY					R-1 ITEM NOMENCLATURE				
RDT&E, N/BA 4					Cooperative Engagement Capability 0603658N				
	FY 95	FY 96	FY 97	FY 98	FY 99	FY 00	FY 01	FY 02	FY 03
ACQUISITION MILESTONES	 II							 III (AN/USG-2)	
PROGRAM MILESTONES		 IOC (AN/USG-1)		  LRIP 1A/B (AN/USG-2)	 LRIP 2 (ANUSG-2/3)	 LRIP 3 (AN/USG-2/3)	 LRIP 4 (AN/USG-2/3)	 PR (AN/USG-3)	 PR/FOC (AN/USG-3)
SHIP INTEGRATION TEST EVENTS	 BG TACTICS EXPLORATION	IOC CERT 	IOT&E DT-IIB OT-IIA1 	Engineering Tests 	DT-IIID (Assist) 	 DT-IIIE (Assist)  DT-IIIF/OT-IIA3 DT-IIIG (Assist) 	TECHEVAL OPEVAL DT-IIIH  OT-IIA4 	FOT&E-1  DT-IIIA  OT-IIIA	FOT&E-2 DT-IIIB  OT-IIIB 
AIR INTEGRATION TEST EVENTS	ACU DT-I DEMVAL P-3 				DT-IIC  OT-IIA2  E-2C	OA 	DT-IIIA  OT-IIIA  E-2C		DT-IIIB  OT-IIIB  E-2C

R-1 SHOPPING LIST - Item No. 60

Exhibit R-2, RDT&E Budget Item Justification

(Exhibit R-2, page 5 of 7)

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Exhibit R-3 Cost Analysis (page 1)							DATE: February 2000					
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NAME AND NUMBER						
RDT&E, N/BA 4			CEC - 0603658N			CEC - Project K2039						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 99 Cost	FY 99 Award Date	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	Cost to Complete	Total Cost	Target Value of Contract
AN/USG-2/3 Development	C/CPAF	Raytheon, St. Peters., FL	432.693	54.800	Nov-98	89.200	Nov-99	35.300	Oct-00	4.000	615.993	TBD
AN/USG-2/3 Development/TDA	C/CPFF	JHU/APL, Laurel, MD	174.833	24.200	Nov-98	10.800	Dec-99	13.500	Oct-00	20.000	243.333	TBD
E-2C Aircraft Integration	C/CPAF	PMA-231	108.238	35.500	Oct-98	11.600	Nov-99	6.400	Oct-00		161.738	
P-3 Aircraft Integration	C/CPAF	Lockheed-Martin	40.512	1.698	Dec-98						42.210	42.210
Baseline 2.2 Software Development	SS/CPAF	Lockheed-Martin		1.250	Apr-99	4.000	Feb-00	2.000	Oct-00	30.000	37.250	TBD
Space Based IR Sensors (SBIRS)	C/CPAF	Lockheed-Martin	3.700	9.726	Aug-99						13.426	TBD
AEGIS Integration	C/CPAF	PMS-400	119.968								119.968	
ACDS Integration	C/CPAF	Raytheon (Hughes), LA, CA	26.266	7.667	Oct-98						33.933	TBD
In-Service Engineering Activity	WR	NSWC, Port Hueneme	0.000	3.048	Mar-99	4.100	Dec-99	4.500			11.648	
Land Based Test Network	PD	SPAWAR (PMW-159)	0.000	1.361	Mar-99						1.361	
Land Based Test Network	PD	NATC, Patuxent River	0.000	1.000	Mar-99						1.000	
Software Support Activity	WR	NSWC, Dahlgren, VA	28.677	3.838	Oct-98	4.700	Jan-00	3.800	Oct-00	CONT.	CONT.	
ILS Planning	WR	NSWC, Crane, IN	19.982	3.289	Oct-98	4.500	Dec-99	4.100	Oct-00	CONT.	CONT.	
Area Air Def. Commander (AADC)	C/CPAF	TBD				9.900				0.000	9.900	
Various	Various	Miscellaneous	67.977	12.079	Oct-98	15.500	Oct-99	6.300	Oct-00	CONT.	CONT.	
Subtotal Product Development			1,022.846	159.456		154.300		75.900		CONT.	CONT.	
Remarks: (1) Award Date indicates initial authorization of funds; (2) Area Air Defense Commander (AADC) prime contractor to be determined.												
Subtotal Support			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												

R-1 SHOPPING LIST - Item No. 60

Exhibit R-3, Project Cost Analysis  
(Exhibit R-3, page 6 of 7)

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Exhibit R-3 Cost Analysis (page 2)							DATE: February 2000					
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NAME AND NUMBER						
RDT&E, N/BA 4			CEC - 0603658N			CEC - Project K2039						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 99 Cost	FY 99 Award Date	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Land Based Test Network (DEP)	WR	NSWC, Dahlgren, VA		2.200	Oct-98						2.200	
Test Support	C/CPAF	Raytheon, St. Peters., FL		1.278	Mar-99	2.000	Nov-99	2.300	Oct-00	2.000	7.578	TBD
AEGIS Test Support	C/CPAF	PMS-400						5.200			5.200	
ACDS Test Support	C/CPAF	Raytheon (Hughes), LA, CA						3.000			3.000	
Test Support	C/CPFF	JHU/APL, Laurel, MD		1.800	Mar-99	2.500	Dec-99	2.500			6.800	TBD
Test Support	WR	NAWC-AD, Pt. Mugu, CA				2.300	Nov-99	2.500			4.800	
Test Support	WR	NRL, Washington, DC				2.000	Jan-00	2.100			4.100	
Test Support	WR	NSWC, Port Hueneme, CA		7.787	Oct-98	4.100	Dec-99	4.100	Oct-00		15.987	
Test Support	PD	SPAWAR (PMW-159)									0.000	
Air Operations Test Support	WR	COMNAVAIRLANT	1.700			3.200	Oct-99	4.600	Oct-00	4.000	13.500	
Air Operations Test Support	WR	NATC, Pax River	2.800	1.429	Mar-99				Oct-00	3.000	7.229	
Test Requirements	WR	COMOPTEVFOR				.500	Jan-00	1.400	Oct-00	1.000	2.900	
Test Data Reduction	WR	NWAS, Corona	5.500	1.000	Oct-98	2.500	Jan-00	1.000	Oct-00	1.500	11.500	
P-3 Support/Target Procurement	PD	NAVAIRSYSCOM				3.700	Jan-00	4.500	Oct-00	3.000	11.200	
ECM Test Support (BIG CROW)	MIPR	Kirkland AFB, NM				1.500	Feb-00	2.000			3.500	
Various	Various	Miscellaneous	37.207	4.949	Oct-98	5.700	Oct-99	3.100	Oct-00	CONT.	CONT.	
Subtotal T&E			47.207	20.443		30.000		38.300		CONT.	CONT.	
Remarks:												
Program Management Support	C/CPFF	Technautics, Alexandria, VA	6.000	2.400	Oct-98	2.400	Nov-99	2.400			13.200	
Various	Various	Miscellaneous	26.738	7.349	Oct-98	3.177	Oct-99	2.657	Oct-00	CONT.	CONT.	
Subtotal Management			32.738	9.749		5.577		5.057		CONT.	CONT.	
Remarks:												
Total Cost			1,102.791	189.648		189.877		119.257		CONT.	CONT.	
Remarks:												

R-1 SHOPPING LIST - Item No. 60

Exhibit R-3, Project Cost Analysis  
(Exhibit R-3, page 7 of 7)

UNCLASSIFIED